

WE CLAIM:

1. A bone fixator for repairing fractures and/or other dislocations of a distal radius and wrist, comprising:

5 at least one distal mounting element configured to be mounted in a metacarpal bone;

at least one proximal mounting element configured to be mounted in the radius;

a distal member, configured to secure the distal mounting element relative to the distal member;

10 a proximal member, configured to secure the proximal mounting element relative to the proximal member; and

a coupling connecting the proximal member and the distal member, wherein the coupling is configured to permit immobilization, as well as adjustable flexion, rotation, and translation of the distal member relative to the proximal member.

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2. The fixator of claim 1, wherein the coupling is adjustably secured to the proximal member, such that one or both of the angle and the distance between the proximal member and the distal member may be adjusted.

20 3. The fixator of claim 2, wherein the coupling includes a ball and socket joint.

4. The fixator of claim 1, wherein translation and flexion of the distal member relative to the proximal member are independently adjustable.
5. The fixator of claim 1, wherein the coupling includes a superelastic portion and one or more rigidizing elements, wherein the rigidizing elements adjustably restrict at least one of translation and flexion of the distal member relative to the proximal member.
6. The fixator of claim 5, wherein the rigidizing elements include a translation lock, configured adjustably to limit translation of the distal member relative to the superelastic portion.
7. The fixator of claim 5, wherein the superelastic portion of the coupling includes a superelastic metal wire, and the rigidizing elements include a coupling bracket configured selectively to restrict the flexion and rotation of the distal element.
8. The fixator of claim 7, wherein the coupling bracket includes bracket arms that are independently adjustable.
- 20 9. The fixator of claim 1, further comprising at least one reference marking configured to aid in setting at least one of the length, orientation, and flexibility of the fixator.

10. A bone fixator for repairing fractures and/or other dislocations of a distal radius and wrist, comprising:

at least one distal mounting element configured to be mounted in a metacarpal bone;

5           at least one proximal mounting element configured to be mounted in the radius; a distal member, configured to secure the distal mounting element relative to the distal member; a proximal member, configured to secure the proximal mounting element relative to the proximal member; and

10          a coupling configured to connect the proximal member and the distal member, wherein the coupling includes a portion capable of superelastic flexion.

11. The bone fixator of claim 10, wherein the bone fixator is capable of dynamic fixation of the wrist.

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12. The bone fixator of claim 10, wherein the superelastic portion includes a superelastic metal.

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13. The bone fixator of claim 10, the superelastic portion including a superelastic metal wire, wherein the wire is generally orthogonal to the distal mounting elements of the distal member.

14. The bone fixator of claim 10, wherein the distal member is configured to permit selective translation along the superelastic portion.

15. The bone fixator of claim 10, wherein the bone fixator is configured to 5 provide static fixation of the wrist when the distal member is substantially immobilized.

16. The bone fixator of claim 10, wherein the bone fixator is configured to provide dynamic fixation of the wrist when the distal member is not substantially immobilized.

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17. The bone fixator of claim 10, the coupling including one or more rigidizing elements, wherein the rigidizing elements adjustably restrict the flexion of the superelastic portion.

15. 18. The bone fixator of claim 17, wherein the rigidizing elements include a coupling bracket configured to selectively restrict at least one of the flexion and rotation of the distal element.

19. The bone fixator of claim 17, the superelastic portion including a 20 superelastic wire, wherein the rigidizing elements include a plurality of spacers disposed on the wire, such that compressing the spacers restricts the flexion of the wire.

20. The bone fixator of claim 19, wherein the rigidizing elements include a translation lock, configured adjustably to limit translation of the distal member on the superelastic wire.

5           21. The bone fixator of claim 10, wherein the superelastic portion includes a nickel titanium alloy.

10          22. The bone fixator of claim 10, wherein the coupling is adjustably secured to the proximal member, such that one or both of the angle and the distance between the proximal member and the distal member may be adjusted.

15          23. The bone fixator of claim 22, wherein the coupling is adjustably secured to the proximal member so that the vertical angle and the lateral angle between the proximal member and the distal member may be independently adjusted.

24. The fixator of claim 10, further comprising at least one reference marking configured to aid in setting at least one of the length, orientation, and flexibility of the fixator.

25. An apparatus for treating fractures and/or other dislocations of a distal radius and wrist comprising:

at least one distal element for securing in a bone on a distal side of the fracture;

at least one proximal element for securing in the radius;

5 a fixator mounted to the distal and proximal elements having a superelastic region permitting dynamic fixation of the fracture.

26. A method of treating fractures and/or other dislocations of the distal radius, comprising:

10 installing a proximal pair of spaced-apart and at least substantially parallel transcutaneous pins in the radius on the proximal side of the fracture;

installing a distal pair of spaced-apart and at least substantially parallel transcutaneous pins in a metacarpal on the distal side of the fracture;

15 mounting an external fixator to the pins, the external fixator having a distal section that is mounted to the distal pins and a proximal section that is mounted to the proximal pins, the sections being connected by a coupling, wherein the coupling is configured to permit adjustable flexion, rotation, and translation of the distal section relative to the proximal section; and

utilizing the external fixator to manipulate the pins to reduce the fracture.

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27. The method of claim 26, wherein reducing the fracture includes immobilizing the coupling.

28. The method of claim 27, further comprising incrementally increasing a degree of freedom in one or more of the flexion, rotation, and translation of the distal section relative to the proximal section.

5           29. The method of claim 28, the coupling including a wire, wherein increasing the freedom of translation of the distal section includes permitting the distal section to translate along the wire.

10          30. The method of claim 28, the coupling including a wire, wherein increasing the freedom of flexion of the distal section includes permitting reversible flexion of the wire.

15          31. The method of claim 28, the coupling including a wire, wherein increasing the freedom of rotation of the distal section includes permitting reversible rotation of the distal section upon the wire.

32. A kit for installing a bone fixator for repairing fractures and/or other dislocations of a distal radius

and wrist, comprising:

at least one distal mounting element configured to be mounted in a metacarpal

5 bone;

at least one proximal mounting element configured to be mounted in the radius;

a distal member, configured to secure the distal mounting element relative to the distal member;

a proximal member, configured to secure the proximal mounting element relative

10 to the proximal member; and

a coupling, configured to permit adjustable flexion, rotation, and translation of the distal section relative to the proximal member.

33. The kit of claim 32, further comprising at least one of a distal template for

15 placing the distal mounting elements in the metacarpal bone and a radial template for placing the proximal mounting elements in the radius.

34. The kit of claim 32, wherein the distal mounting elements and proximal mounting elements comprise self-drilling pins.

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35. The kit of claim 32, further comprising one or more tools for adjusting one or more of the permitted flexion, rotation, and translation of the distal member relative to the proximal member.